REMARKS

This application has been carefully reviewed in light of the Office Action dated September 29, 2006. Reconsideration and favorable action in this case are respectfully requested.

The Examiner has rejected claims 1-12 under 35 U.S.C. §103(a) as being unpatentable over U.S. Pub. No. 2002/0075080 to Nelson in view of U.S. Pat. No. 6,323,736 to Jansson. Applicants have reviewed these references in detail and do not believe that they disclose or make obvious the invention as claimed.

The Examiner states that:

> For clarification, the calibration is described in the supporting document US Pat. No. 5,942,949 as stated in paragraph [0020]. As described in Column 3, line 55 - Column 4, line 59 of US Pat. No. 5,942,949, state machine 316 performs a linear search algorithm or a binary search algorithm and further states that "each digital control input value N needs to be maintained to test each of the VCO operating curves in the search sequence".

The claims of the present application have not at any time been rejected over the Wilson patent, U.S. Pat. No. 5,942,949. The Wilson patent is not incorporated by reference in the Nelson reference, nor does the Nelson patent state that selection of a VCO curve is performed as in Wilson. Wilson is simply used as an example of a self trimming PLL circuit which noes not address automatic self-calibration of VCO gain. Applicants believe that it is improper to reject claims in the present application based on a disclosure which was not previously identified by the Examiner as a reference, simply because the reference is cited in the Nelson publication. Had the Wilson patent been used as a reason for rejection in the most recent Office Action, the rejection could not properly have been made final.

With regard to the merits of the rejection using the Wilson patent as a reference, Applicants disagree with the Examiner's assertions. Similar to Nelson, Wilson states:

> The desired frequency of the VCO output signal F_{OSC} is the frequency of the input signal F_{IN} (ignoring for the time being any frequency multiplication or division resulting from dividers 310 or 312). By purposefully selecting digital control input values N, state machine 316 can eventually identify the two VCO operating curves that have center frequencies just above and just below the frequency of the input signal F_{IN}. *Either one of these two operating curves can then be selected for use during normal PLL operations.* In one embodiment, state machine 316 performs a linear search algorithm in which the values for the digital control input N are selected linearly starting at one end of the range of possible values (e.g., 0) and proceeding towards the other end of the range until the quiescent loop-filter voltage V_{LF} flips from one side (e.g., ground) to the other (e.g., V_{DD}). In an alternative embodiment, state machine 316 performs a binary search algorithm in which each new digital control input value is selected midway between two previously selected values that yielded opposing quiescent loop-filter voltages, until two consecutive digital control values are found that yield opposing quiescent loop-filter voltages. [Emphasis added]

Like Nelson, the Wilson reference does not provide any teaching of testing *at the initial control word* to determine whether it should be used to generate the first clock signal at the new desired frequency, or if the initial control word should be changed to an adjacent control word to generate the first clock signal to generate the first clock signal at the new desired frequency. Wilson simply finds two adjacent VCO operating curves that have center frequencies above and below the frequency of the input signal F_{IN} and selects one of the operating curves.

Accordingly, *no* testing is done *after the initial search*, and there is *no determination made as to whether a control word adjacent to the initial control word would be better for generating the first clock signal at the new desired frequency*.

With regard to claim 3, Applicants believe that the Examiner has misinterpreted the teaching of Wilson. In Wilson, V_{REF} is applied to he voltage input of VCO 308, V_{REF} being at the nominal center of the range of input voltages. This is to generate a frequency F_{OCS} at the center of the frequency range. The sentence recited by the Examiner states that the charge pump 304 will eventually drive the loop-filter voltage V_{LF} either to ground

of V_{DD} depending upon whether the frequency of the feedback signal is greater or less than the frequency of the input signal F_{IN}. Depending upon which rail V_{LF} converges on, it can be determined whether the *center frequency* of the VCO curve was higher or lower than F_{IN}. There is, however, no comparison between the desired frequency to upper and lower bounds of a frequency range for the voltage controlled oscillator while configured according to the initial control word, as required by claim 3. At no time does Wilson compare a frequency at either bound of the operating curve to the input frequency.

In claim 4, the logic circuitry determines the initial control word using fast comparisons between an actual frequency at the predetermined control voltage and the desired frequency and determines whether the initial control word should remain the same by using more precise comparisons between the actual frequency and the desired frequency. Paragraph [0022] states that during *normal* operations, SW1 is closed and SW2 is open, the allowing loop-filter voltage V_{LF} to be applied to the VCO. There is no teaching that SW1 is used *to calibrate the voltage controlled oscillator to frequency range*, since it is not used during calibration.

In claim 5, the logic circuitry tests the initial control word by determining whether the difference between the desired frequency and an actual frequency for the voltage controlled oscillator while configured according to the initial control word is within a predetermined threshold. Paragraph [0018] of Nelson has no such teaching. The Examiner states that the initial control word (L) is within a predetermined threshold (Max and Min). L is the range of control words. The initial control word is a value – specifying a single value for L. The test of the initial control word is performed by determining whether the difference between the desired frequency and an actual frequency *while configured according to the initial control word* is within a predetermined threshold.

The Examiners statement simply doesn't make sense with regard to the claim language. First, L is not a frequency and cannot be compared with the minimum and maximum frequencies. Second, L can't be compared with a desired frequency – again, because L is not a frequency, it is used to select a curve. Third, whether the initial control word is between Min and Max curves is irrelevant to claim 5.

Accordingly, Applicants respectfully request allowance of claim 1-12.

An extension of one month is requested and a Request for Extension of Time under § 1.136 with the appropriate fee is attached hereto.

The Commissioner is hereby authorized to charge any fees or credit any overpayment, including extension fees, to Deposit Account No. 20-0668 of Texas Instruments Incorporated.

Applicants have made a diligent effort to place the claims in condition for allowance. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Alan W. Lintel, Applicants' Attorney at (972) 664-9595 so that such issues may be resolved as expeditiously as possible.

For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,

/Alan W. Lintel/

Alan W. Lintel
Attorney for Applicant(s)
Reg. No. 32478

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Anderson, Levine & Lintel
14785 Preston Rd.
Suite 650
Dallas, Texas 75254
Tel. (972) 664-9595